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animal, while in a small-toothed form the same retardation, if present by inheritance, would cause a more or less disadvantageous gap, best filled by the assumption of a milk tooth.

The first stage, or stage of retardation, appears to be still represented in the anterior upper incisors of many Polyprotodont Marsupials, and it is therefore believed that these teeth now represent the stage at which the ancestors of the Marsupials and Eutheria diverged from one another, a stage at which the further development of milk incisors was just commencing.

Following out this idea, it is shown how easily the transition from the Metatherian to the Eutherian stage of tooth-change may have taken place, a transition by the help of which a complete series of diagrams can be drawn up, following the history of each individual tooth, from the dentition of the earliest Mammals, homodont and monophyodont, as no doubt the unmodified Prototheria were, down to the varied forms of dentition, heterodont and diphyodont, existing at the present day.

All the orders of Mammalia fall easily enough into their places in the main line of this scheme with one exception, namely, the Edentata, in whose case the evidence all tends to prove the correctness of Professor Parker's suggestion as to their nearly direct derivation from the Prototheria, a suggestion that the characters of their teeth most fully support. On the same principles, therefore, as the main Proto-meta-eutherian line of tooth development is drawn up, a side branch, for which the name "Paratherian" is suggested, is made for the Edentates. Within that branch very little heterodontism has ever been developed, but otherwise the changes, except in the case of the as yet inexplicable dentition of *Orycteropus* have been of the same nature as those in the main line, the superaddition of a milk set of teeth in *Tatusia* being, as in the Meta- and Eu-theria, the last and most highly specialised development.

IV. "Note on Protection in Anthrax." By L. C. WOOLDRIDGE, M.D., D.Sc., Demonstrator of Physiology, Guy's Hospital. Communicated by E. KLEIN, M.D., F.R.S. Received April 16, 1887.

Hitherto in the few cases in which protection against zymotic disease has been found possible, it has been effected by the communication to the animal of a modified form of the disease against which protection is sought.

I have succeeded in protecting rabbits from anthrax by an altogether different process, and although this is scarcely, at present, of practical utility, it may perhaps be found to be of some interest as

regards the general nature of protection in this and other diseases depending on micro-organisms.

I use as a culture fluid for the anthrax bacillus a solution of a proteid body which is obtained from the testis and from the thymus gland. I have described this substance to the Society on a previous occasion,\* so that I need not repeat the description of the process used in its preparation.

The proteid substance is dissolved in dilute alkali and the solution sterilised by repeated boiling. It is then inoculated with anthrax and maintained at 37° C. for two or three days.

The growth is generally not very abundant, and at the end of the period mentioned is removed from the culture fluid by filtration. A small quantity of the filtered culture fluid is injected into the circulation of a rabbit, and it is then found that the animal will not take anthrax.

A subcutaneous inoculation of extremely virulent anthrax blood made at the time of the injection of the protecting fluid, and two subsequent inoculations at intervals of five and ten days, remain entirely without effect. The animals used as a control invariably die. Four rabbits have been protected in this way.

If the anthrax grown in the fluid be inoculated it either kills or it has no effect. It does not protect in the slightest degree.

The injection of the culture fluid in which no anthrax has grown is without effect. The animals die as usual when inoculated. The injection of the fluid itself causes no ill symptoms whether anthrax has grown in it or not.

If other albuminous fluids, *e.g.*, blood-serum, be used as a culture medium and the filtered culture fluid be injected, it exerts no protection. It may be fairly concluded that the growth of the anthrax bacillus in the special culture fluids used in these experiments gives rise to a substance which when injected into the organism protects against an immediate and subsequent attacks of anthrax.

It would obviously be of very great advantage if some such method as this could be used for the zymotic diseases affecting man for which no protective inoculation in the ordinary sense, appears possible.

I am indebted to the Medical Officer to the Local Government Board for permission to publish this short account of these experiments, the full description of which will appear in his report. I must also express my thanks to Dr. Klein, F.R.S., for kindly supplying me with many anthrax cultivations.

\* L. C. Wooldridge, "Intravascular Clotting," 'Roy. Soc. Proc.,' 1886.